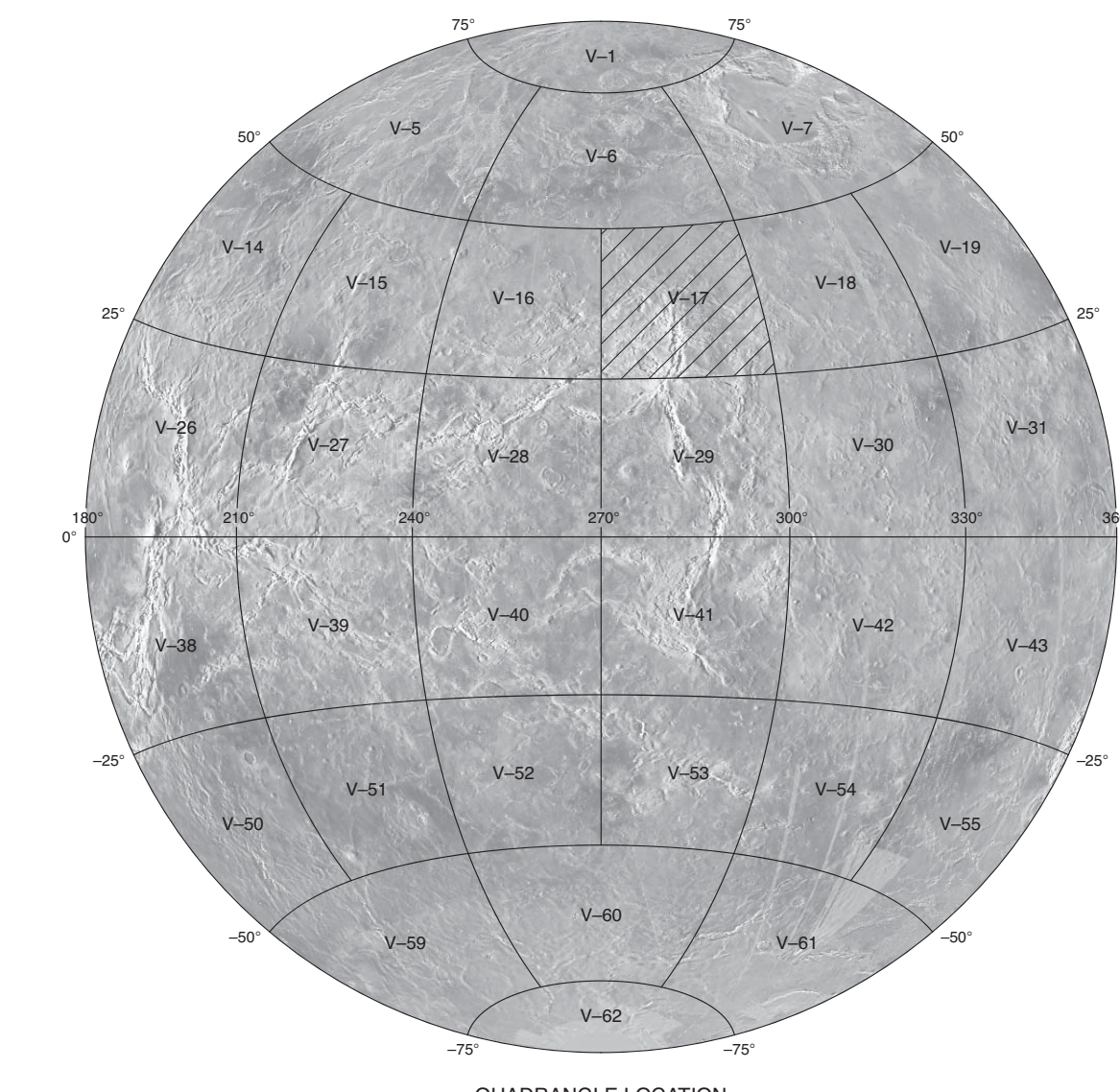


SCALE 1:4 711 886 (1 mm = 4.712 km) AT 25° LATITUDE  
1:5 000 000 AT 34° AND 73° LATITUDES  
LAMBERT PROJECTION

Prepared on behalf of the Planetary Geology and Geophysics Program,  
Solar System Exploration Division, Office of Space Science, National  
Aeronautics and Space Administration  
Edited by Carolyn Donkin; cartography by Darlene A. Ryan  
Manuscript approved for publication May 1, 2008



QUADRANGLE LOCATION  
Photomosaic showing location of map area. An outline of  
1:5,000,000 scale quadrangles is provided for reference.

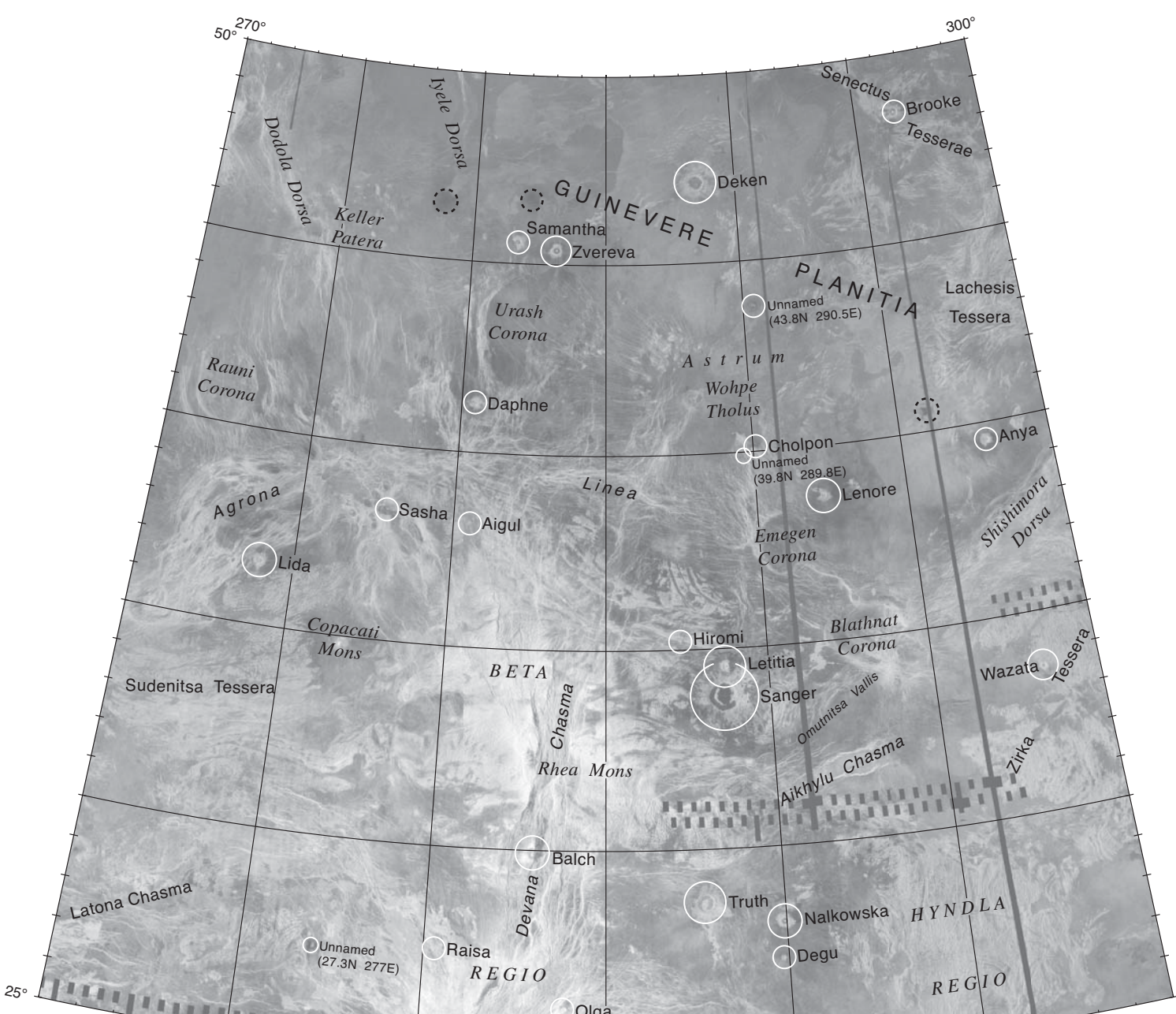


Figure 1. Magellan SAR image of the Beta Regio (V-17) quadrangle showing names of physiographic features according to <http://planetarynames.wr.usgs.gov/>. Three dashed circles in the northern part of the region show positions of spotlights. White circles show impact craters.

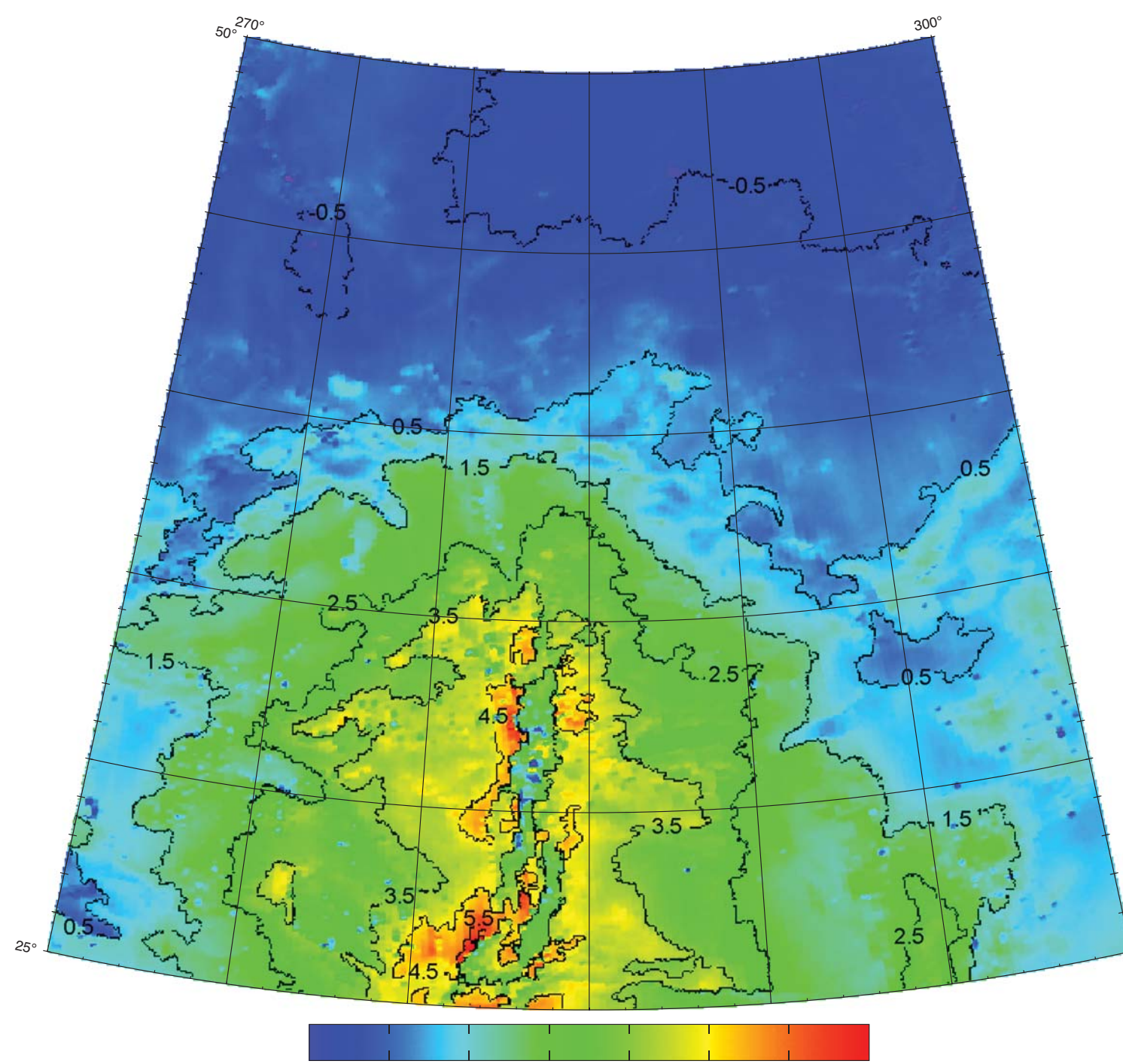
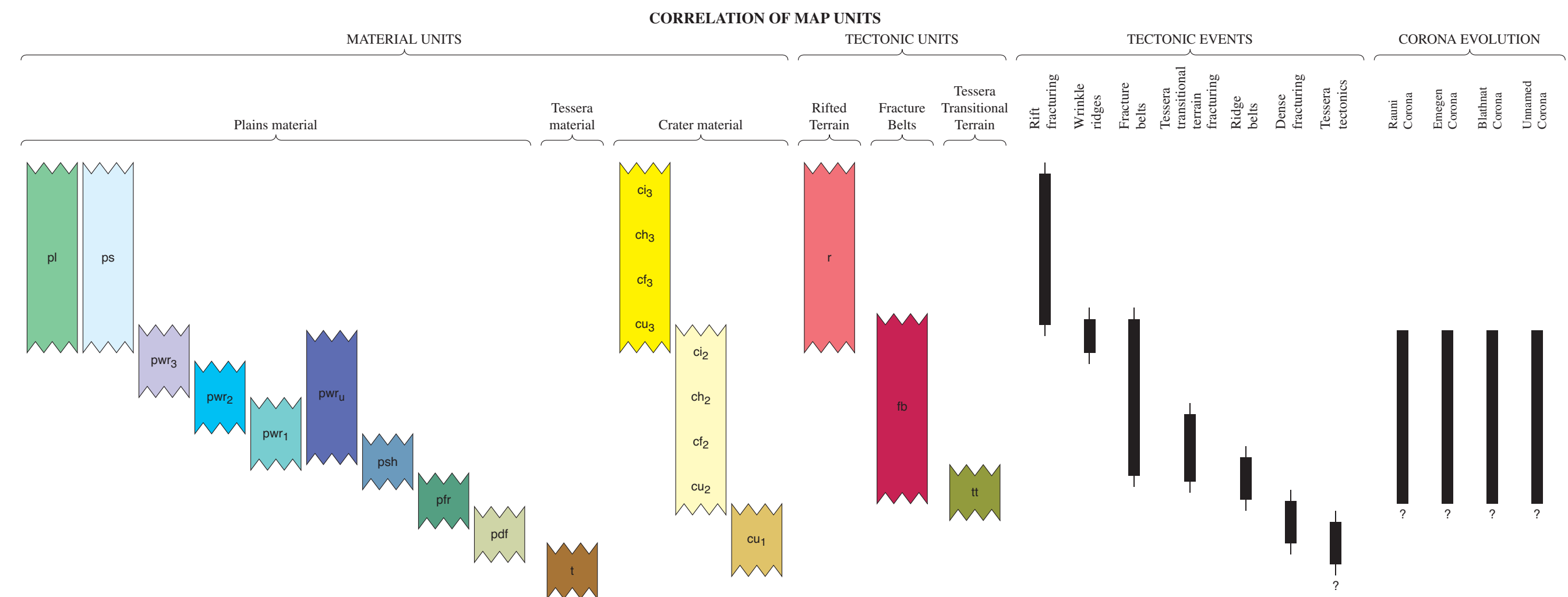


Figure 2. Topographic map of the Beta Regio (V-17) quadrangle, Venus, based on Magellan data. Contour interval is 1 km.



#### DESCRIPTION OF MAP UNITS

[Map units are defined, characterized, and interpreted on the basis of radar backscatter, surface texture and morphology; associated features of apparent volcanic and tectonic origin; and roughness, reflectivity, emissivity, and topography. Although most map units are rock materials, some are defined on the basis of pervasive tectonic structure that obscures the underlying materials and becomes part of the characteristics of the surface morphology. Type localities are indicated for units previously defined (Basilevsky and Head, 1998; Ivanov and Head, 2001a) and reference localities are indicated for units in the quadrangle.]

#### PLAINS MATERIALS

- Lobate plains material**—Homogeneous plains material with internal elements arranged in parallel to sinuous to lobate radar brighter and darker strips and patches; unit boundaries are typically lobate. *Type locality:* 5.5° N, 196.0° E; *reference locality:* 28.3° N, 280.2° E. *Interpretation:* Complexes of lava flows locally disturbed by rift-associated deformation.
- Smooth plains material**—Smooth plains material of uniformly low backscatter. Boundaries of the unit often show narrow swanages of the unit embaying adjacent units or filling narrow troughs. *Type locality:* 3.5° N, 198.2° E; *reference locality:* 40.3° N, 285° E. *Interpretation:* Volcanic fields locally disturbed by rift-associated deformation.
- Wrinkle ridged plains material**—Homogeneous plains material of intermediate-low and low to intermediate-high radar backscatter complicated by narrow linear to anastomosing wrinkle ridges in parallel lines or intersecting networks. *Type locality:* 8.0° N, 177.0° E. *Interpretation:* Regional plains material of volcanic origin deformed by wrinkle ridges; sources of plains not obvious.
- Member 3**—Plains material of relatively low radar backscatter. Modified by wrinkle ridges. *Reference locality:* 41.6° N, 294° E. *Interpretation:* Lava fields subsequently deformed by wrinkle ridges of contractional origin.
- Member 2**—Plains material of generally relatively high radar backscatter commonly with lobate boundaries. Modified by wrinkle ridges. *Reference locality:* 48.1° N, 282.9° E. *Interpretation:* Lava flows subsequently deformed by wrinkle ridges.
- Member 1**—Plains material of generally relatively low radar backscatter; locally mottled. Modified by wrinkle ridges. *Reference locality:* 45.5° N, 279.0° E. *Interpretation:* Lava flows subsequently deformed by wrinkle ridges.
- Member w**—Plains material of generally relatively low radar backscatter; locally mottled. Modified by wrinkle ridges. *Reference locality:* 35.0° N, 276.0° E. *Interpretation:* Lava fields subsequently deformed by wrinkle ridges.
- Shield plains material**—Plains material of intermediate radar backscatter characterized by abundant small shield-shaped features (a few as much as 10–20 km diameter) commonly with summit pits. Shields occur in clusters, giving unit a locally hilly texture. Unit in places crossed by wrinkle ridges. *Type locality:* 43.5° S, 131.0° E; *reference locality:* 32.8° N, 293° E. *Interpretation:* Shields are interpreted to be volcanic edifices.
- Fractured and ridged plains material**—Plains material of intermediate radar backscatter locally modified by ridges from 5 to 10 km wide and several tens of kilometers long. *Type locality:* 37.7° N, 296.0° E; *reference locality:* 26.5° N, 297.7° E. *Interpretation:* Volcanic plains material deformed into ridge-like belts by contraction.
- Densely fractured plains material**—Flat plains-like material intensely fractured by closely spaced narrow parallel structures 10 to 30 km long and less than 1 km wide; parallelism is observed only within 100- to 300-km-wide blocks; radar bright owing to dense fractures. *Type locality:* 48.5° N, 15.0° E; *reference locality:* 42.3° N, 291.5° E. *Interpretation:* Volcanic plains material very highly modified by fractures of probable extensional origin. Local changes in fracture density suggest penetration of later volcanic material.
- Tessera material**—Radar bright and dominated by closely spaced ridges and grooves oriented in at least two directions, commonly orthogonal; terrain typically elevated by several hundred meter above the adjacent units. Embayed by all plains units. *Type locality:* 67.5° N, 20.0° E; *reference locality:* 34.5° N, 275.5° E. *Interpretation:* Material intensely deformed by contractional and extensional structures.

#### CRATER MATERIALS

- Upper crater material unit**—Crater materials of craters superposed completely or partly on psh+pw material and having clear radar dark halo. Subdivided into three facies: intra-crater material including central peaks, floor, walls (c1g); hummocky ejecta (c2g); and ejecta outflows (c3g). In cases where crater was small (< 6 km in diameter), undivided crater materials (c2g) were mapped. *Reference locality:* 45.4° N, 283° E. for c1g, c2g, and c3g; and 43.8° N, 290.5° E. for c2g. *Interpretation:* Impact craters and associated ejecta that have lost their parabola through erosion or formed without one, but maintain a clear radar dark halo.
- Middle crater material unit**—Crater materials of craters superposed completely or partly on psh+pw material and having a faint or no radar dark halo. Subdivided into three facies: intra-crater material including central peaks, floor, and walls (c1g); hummocky ejecta (c2g); and ejecta outflows (c3g). In cases where crater was small (< 6 km in diameter), undivided crater materials (c2g) were mapped. *Reference locality:* 47.1° N, 285.5° E. for c1g, c2g, and c3g; and 38.5° N, 277.5° E. for c2g. *Interpretation:* Impact craters and associated ejecta, whose radar dark halo degraded to become faint or completely disappeared.
- Lower crater material unit**—Crater materials of craters embayed by the psh+pw material. Represented by only one crater, Agni, which is only 6 km in diameter so it was mapped as undivided crater materials (c1g). *Reference locality:* 38.2° N, 280.4° E. *Interpretation:* Impact craters predating emplacement of regional psh+pw plains.

#### TECTONIC UNITS

- Tessera transitional terrain**—Areas of unit pt and locally pdf intensely fractured in a tessera-like (in at least two directions) manner. *Type locality:* 29.8° N, 77.9° E; *reference locality:* 28.0° N, 294.0° E. *Interpretation:* Volcanic plains material highly modified by fractures of extensional origin.
- Fracture belts**—Belts of intensely fractured terrain with numerous structures parallel and/or oblique to the belt trend. *Type locality:* 41.0° S, 345.0° E; *reference locality:* 38° N, 298.2° E. *Interpretation:* Volcanic plains and probably local tessera material highly modified by fractures of extensional origin.
- Rifted terrain**—Belts of intensely fractured terrain saturated with numerous anastomosing faults. *Type locality:* 32.0° N, 283.5° E; *reference locality:* 25.9° N, 284.5° E. *Interpretation:* Volcanic plains and local tessera materials highly modified by fractures of extensional origin.

- Contact**—Dashed where approximately located
- Ridge**
- Wrinkle ridge**
- Graben**
- Fault or lineament**
- Corona**
- Approximate boundary of Wolpe Tholus**
- Rim of impact crater (>10 km diameter)**
- Inner rim of impact crater**
- Central peak of impact crater**
- Rim of impact crater (<10 km diameter)**
- Spotlight**
- Dark halo**

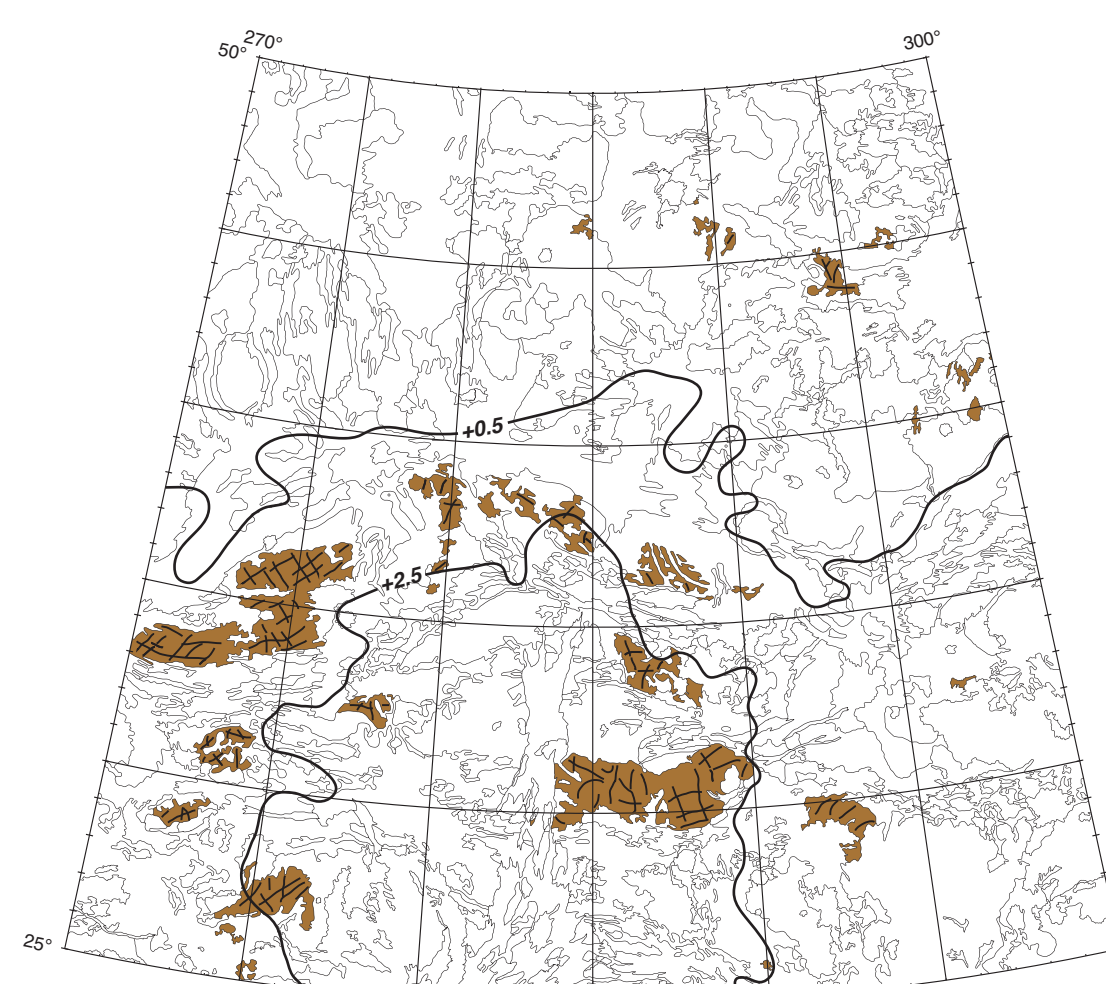


Figure 25. Tessera terrain (t) outcrops (color areas) and the major tessera-forming structures (black lines within color areas). On this map and figures 26 through 31, the altitudinal contour lines +0.5 km and +2.5 km, as well as the geologic unit boundaries, are shown.

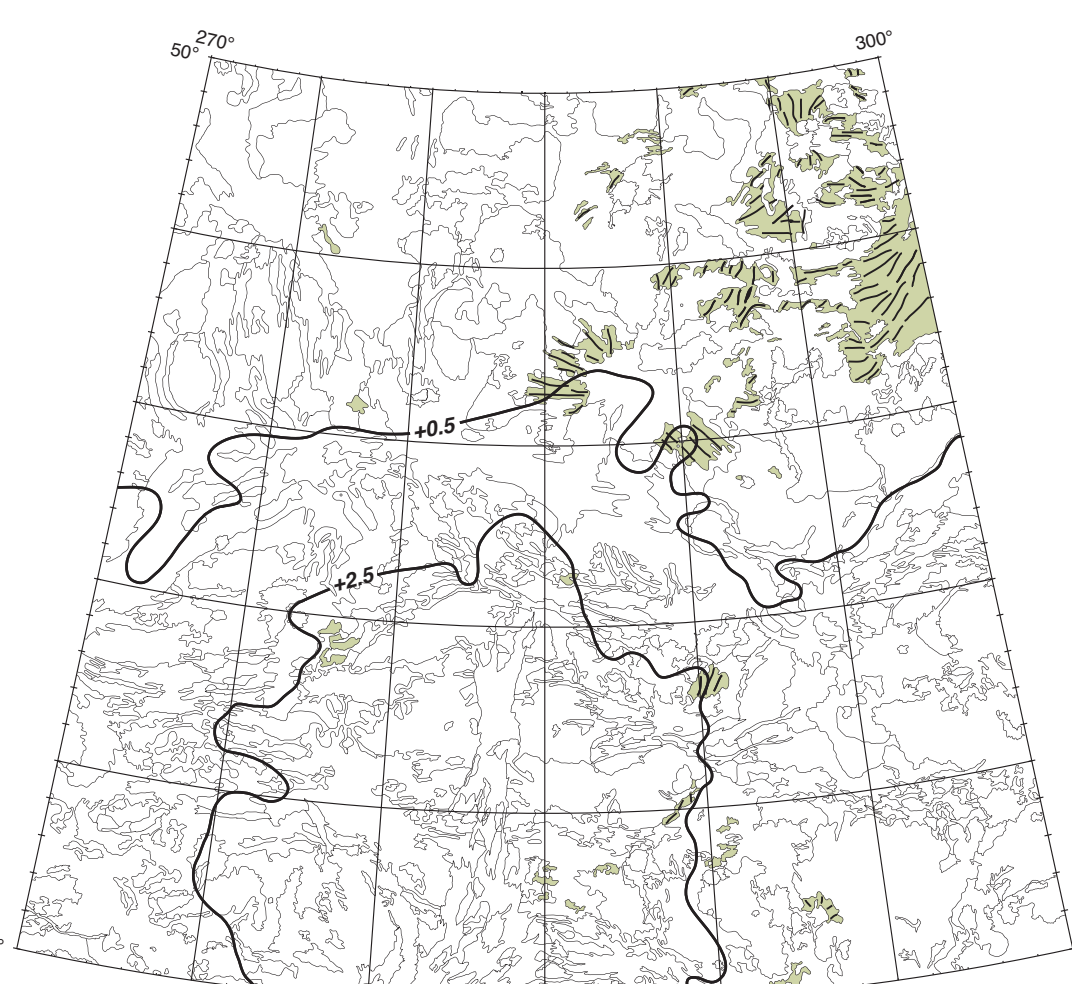


Figure 26. Densely fractured plains (pdf) outcrops (color areas) and their major structures (black lines within color areas).

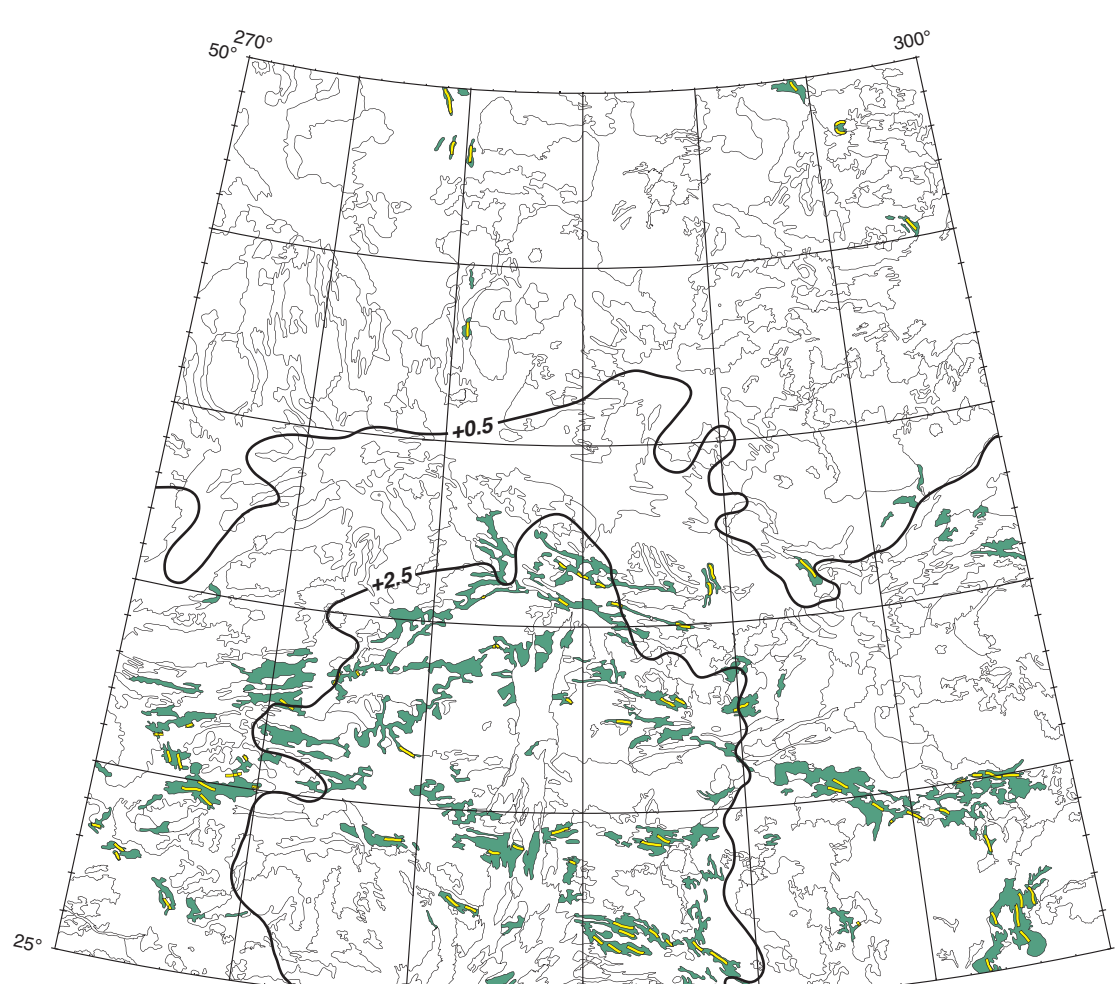


Figure 27. Ridged and fractured plains (pfr) outcrops (color areas) and their major structures (yellow and black lines within and outside color areas).



Figure 28. Tessera transitional terrain (tt) outcrops (color areas) and major structures (black lines within color areas).

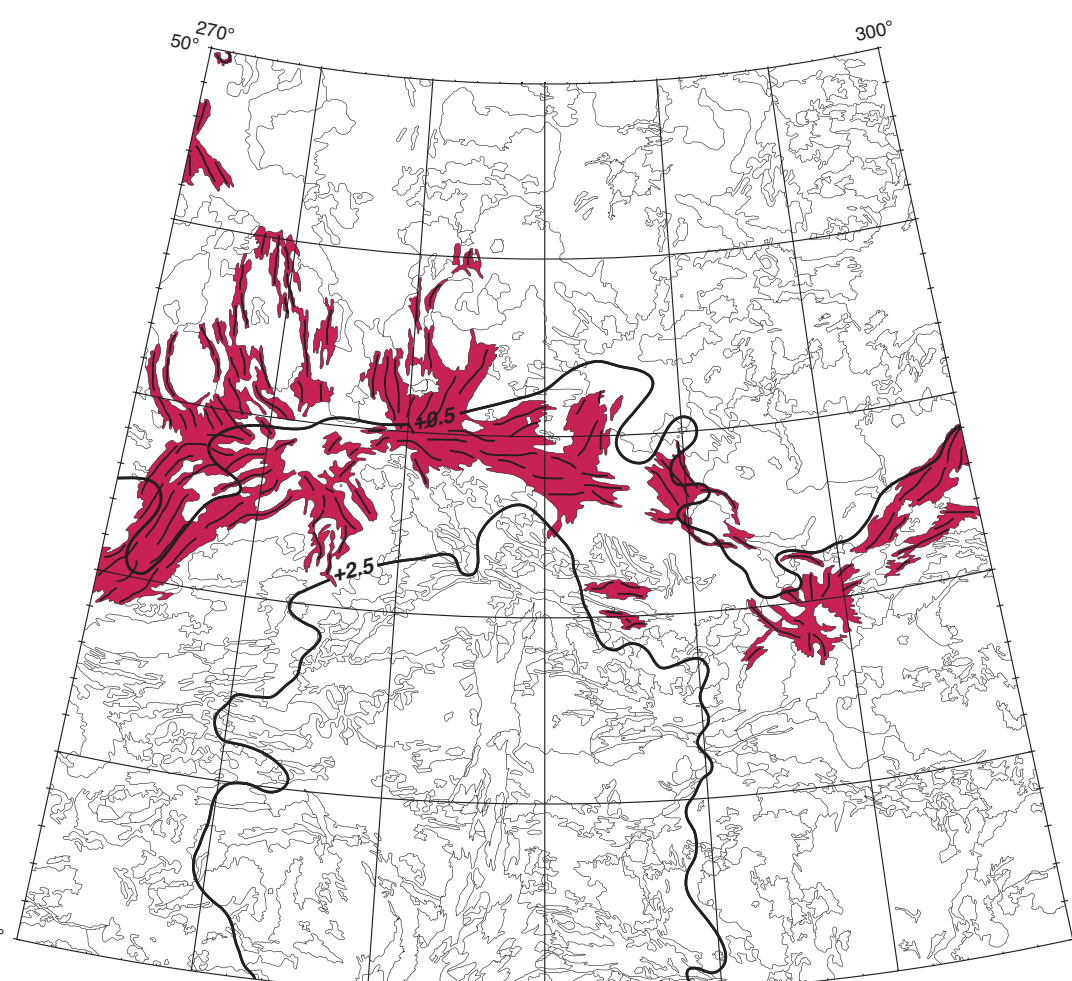


Figure 29. Fracture belts (fb) outcrops (color areas) and trends of their major structures (black lines within color areas).

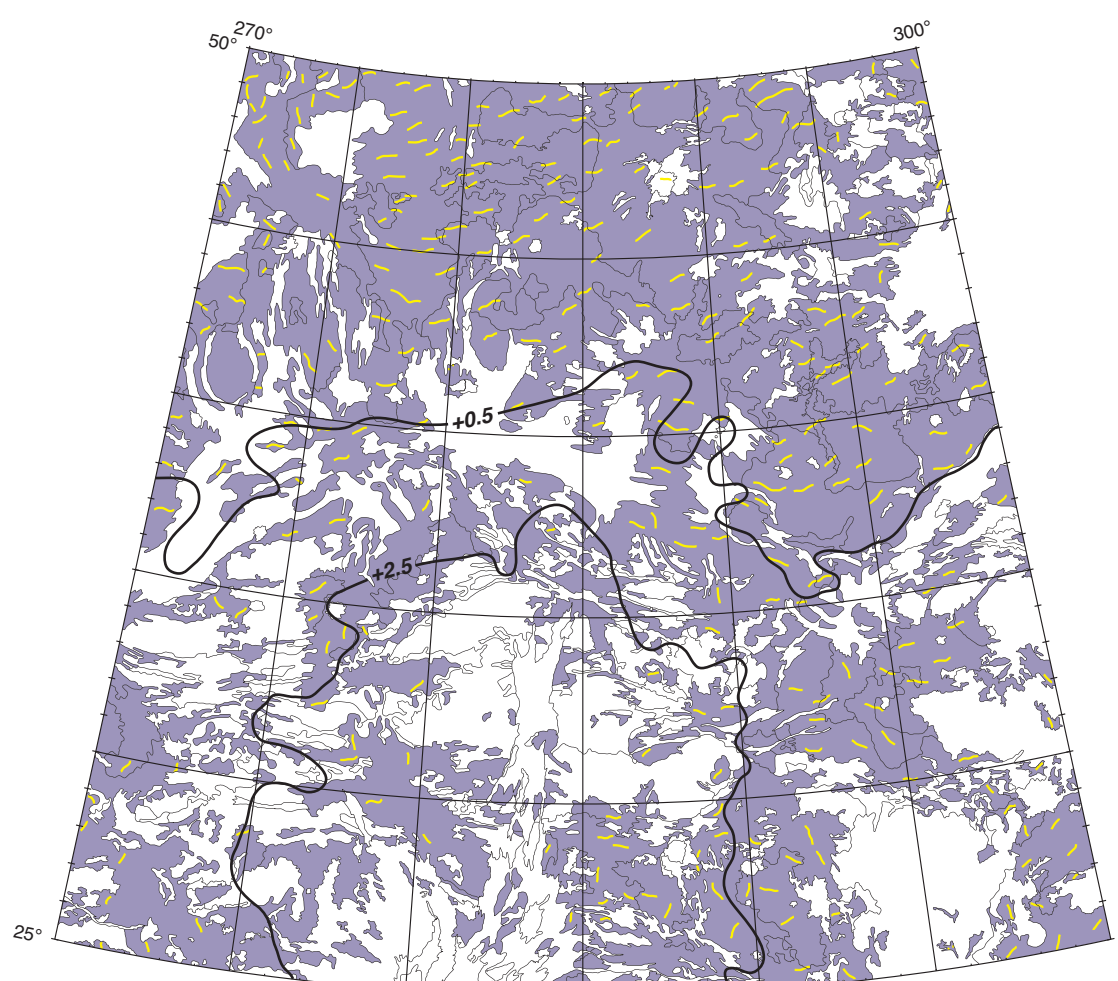


Figure 30. Wrinkle-ridged regional plains (psh+pw) material outcrops (color areas) and trends of major wrinkle ridges (yellow lines within the color areas) deforming them.

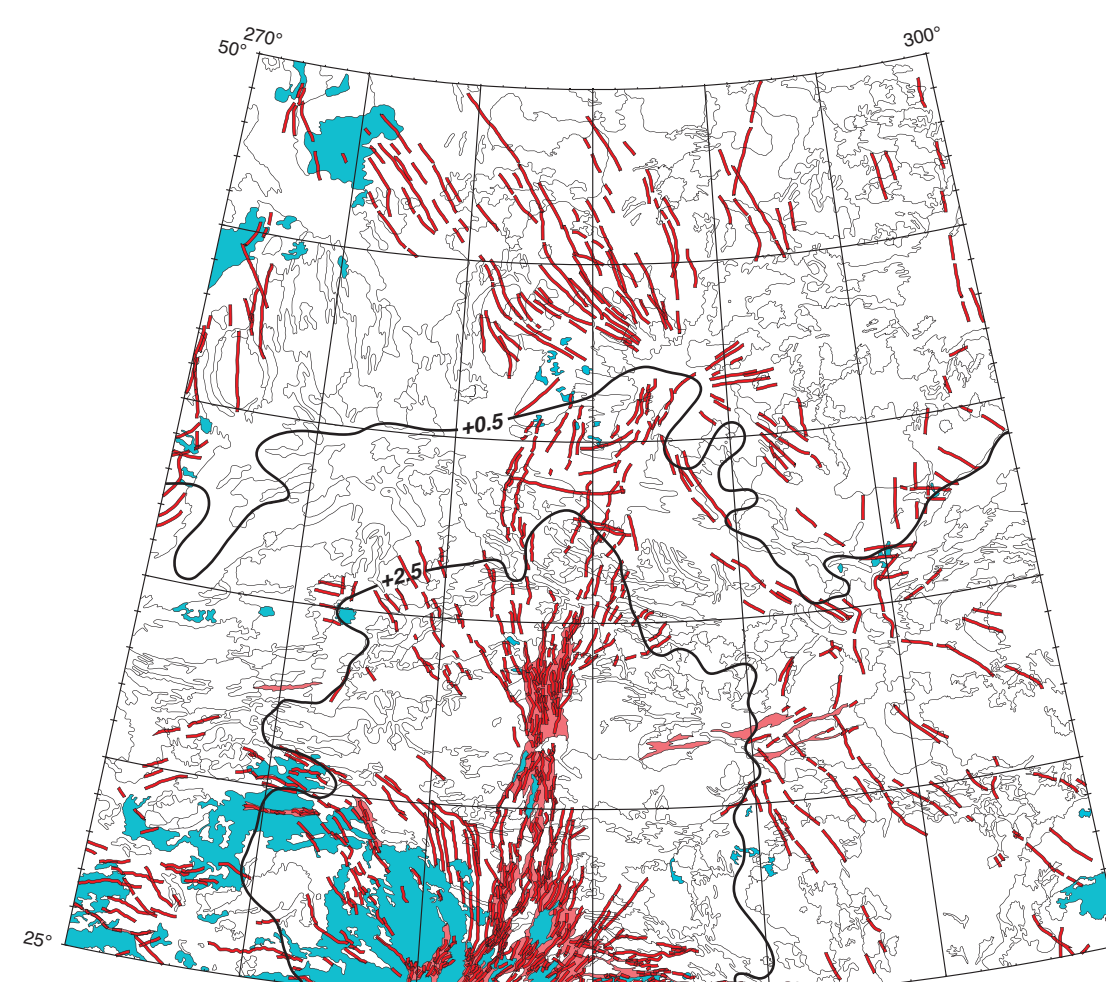


Figure 31. Rifted terrain (r) outcrops (pink fillings), areas occupied by smooth (ps) and lobate (pl) plains (tan/purple fillings), and major trends (black-and-red lines) of young (post-regional) plains faults.

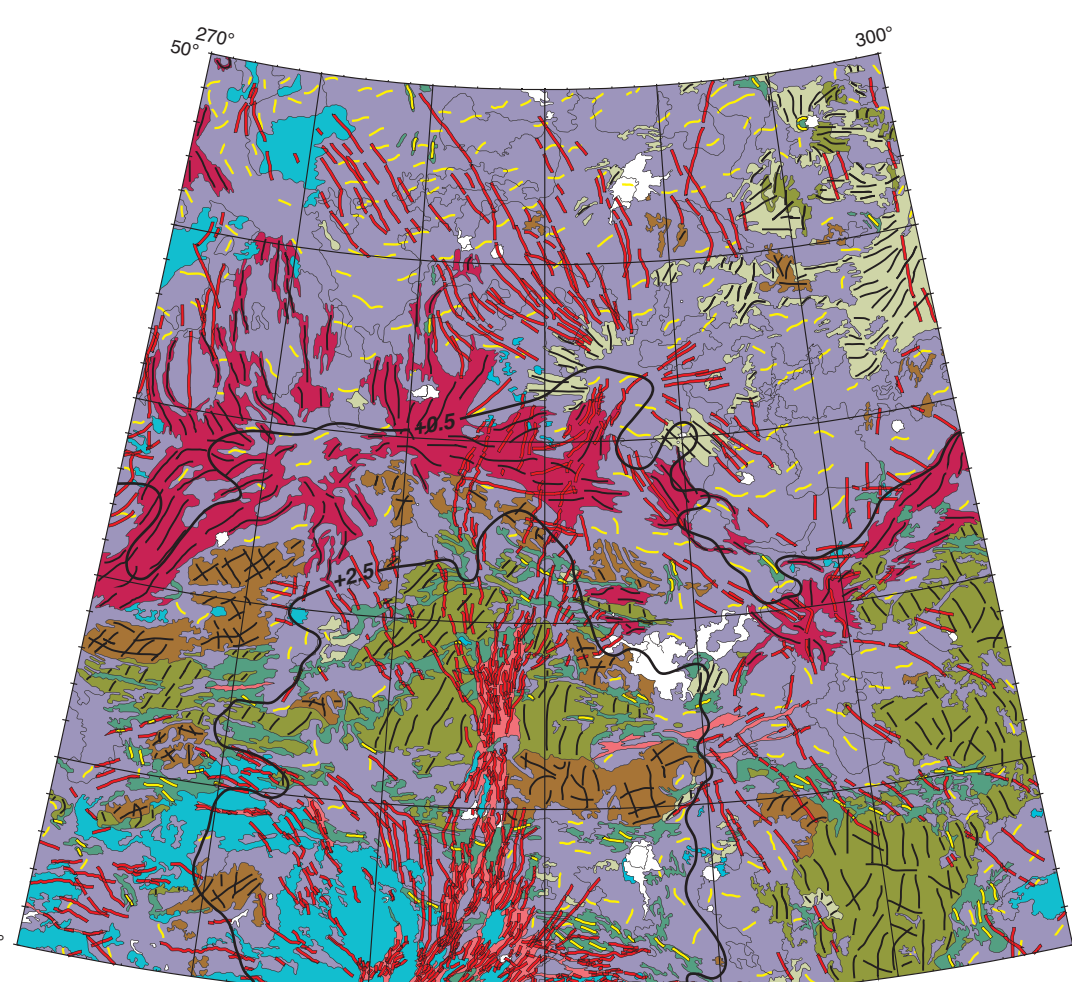


Figure 32. Map showing all structures shown in figures 25 through 31. Variations in color designate different material units (see figs. 25 through 31).

## Geologic Map of the Beta Regio Quadrangle (V-17), Venus

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2008

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